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On the 15th of November, 1859, between 9 and 10 o'clock in the morning, an extraordinary meteor was seen in several of the New England States, New York, New Jersey, District of Columbia, and Virginia. The apparent diameter of the head was nearly equal to that of the sun, and it had a train, notwithstanding the bright sunshine, several degrees in length. Its disappearance on the coast of the Atlantic was followed by a series of the most terrific explosions. It is believed to have descended into the water—probably into Delaware Bay. A highly interesting account of this meteor, by Prof. Loomis, may be found in the *American Journal of Science and Arts*, for January, 1860.

On February 6th, 1818, one was seen in England at 2 P. M., shining with a light equal to that of the sun.

On November 12th, 1828, a meteor was seen in the sunshine at Surg, France.

Humboldt, after describing the great shower of 1799, witnessed by himself and Bonpland, states that "the phenomenon ceased by degrees after 4 o'clock and the bolides and falling stars became less frequent, but we still distinguished some toward the north-east a quarter of an hour after sunrise."

June 17th, 1779, about midday, the eminent French astronomer Messier saw a great number of black points crossing the sun. Rapidly-moving spots were also seen by Pastorff on the following dates: October 23d, 1822; July 24th and 25th, 1823; October 18th, 1836; and on several subsequent occasions the same astronomer witnessed similar phenomena.

Another transit of this kind has been seen quite recently. On the 8th of May, 1865, a small black spot was seen by Coumbary to cross the solar disk.

Thus we have well-authenticated records of meteors having been seen as bright bodies in bright sunlight, and that they have been seen far beyond our atmosphere as black spots on the sun's disk.

The November meteors proper from Leo were not very numerous this year. On November 13 no meteors from Leo were seen. Mr. W. S. Franklin watched during the latter part of the night of the 13th, and I the first part. On the 14th, 15th and 16th the weather was very pleasant, so Mr. Franklin and myself watched for Leonides from 12 o'clock, midnight, until morning, Mr. Franklin watching one part of the sky, and I the other. We recorded at least thirty that could be traced to Leo.

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## ON THE PHOSPHORESCENCE OF CHLOROPHANE FROM PIKE'S PEAK.

BY PROF. G. H. FAILYER, STATE AGRICULTURAL COLLEGE.

During the summer of 1881, the writer collected fluorite of various colors—white, green, rose and purple—in the Pike's Peak region.

Having recently had occasion to examine its property of phosphorescence, he found that it exhibited phenomena so unlike what he had anticipated from his knowledge of the phosphorescence of fluorite, that he made a somewhat minute examination of the specimens. It was first observed that when fragments of the fluorite—these fragments being indifferently fine powder or thin pieces an inch across—were dropped upon a metallic plate heated to a temperature considerably below redness, a green light was soon emitted. The green light deepened in tint as the temperature increased, and gradually gave place to light of a violet color. This, in turn, became of deeper hue, and at last faded. It is well known that fluorite phosphoresces when heated, that some specimens give white light, some green, others violet or purple; and that when brought to a sufficiently high temperature they all lose the power to phosphoresce. But this change of color as the temperature is raised was entirely unexpected, and I have searched the books in vain to find mention of it. The September, 1884, *Am. Jour. of Science*, contains

an account of a chlorophane from Virginia and one from Siberia, which passes from light green to a fine emerald green as the temperature rises, but no mention is made of a change of hue, although the mineral was placed on a live coal. I was sufficiently interested to investigate further. If the fragment be cooled when emitting either the green or the purple light and be heated again, the light which it was giving when cooled will return. Thus, if giving purple light and then cooled and again heated, it does not now first give the green, but emits the purple as soon as it reaches the temperature at which it became non-luminous. It was found also that the several specimens became luminous at temperatures ranging from  $100^{\circ}$ – $110^{\circ}$  C., and that the purple violet tint appeared at  $170^{\circ}$ – $180^{\circ}$  C. It was impossible with the Hg. thermometer to measure the temperature at which the fluorite lost the power of phosphorescence, but it was below a red heat in the form of the experiment tried by me. It is by no means a matter of indifference whether the temperature rises slowly or rapidly in exciting phosphorescence. A piece of the mineral was broken into two nearly equally portions. One of these was heated rapidly, the other slowly. That rapidly heated emitted a fine green which was succeeded by a distinct and moderately deep purple. The slow heating was accomplished by placing the mineral on the edge of a metal plate heated in the center by a gas flame. It became faint green as soon as it became warm. Presently the light entirely disappeared; on moving the mineral to a warmer part of the plate, the green phosphorescence again appeared, to disappear and reappear as before. At length it lost the power of phosphorescing by increasing the temperature. In other words, its power to emit light was gone. In this case of slow heating only the faintest approach to a violet tint was perceptible. I have no doubt that by careful manipulation it might have been made to yield pure green light only; and indeed, I believe that if the temperature be very slowly raised these specimens of fluorite would ultimately lose the power of giving out phosphorescent light at any temperature without at any time becoming luminous. Experiments upon this point have not been entirely conclusive, but have indicated this result. If it be true that by slow heating, specimens which more rapidly heated give both green and purple light, yield only green light, and that if very slowly heated no phosphorescent light will be given out however high the temperature be raised, then the molecular change, whatever it be, that causes phosphorescence, and which when effected precludes the recurrence of the phenomenon, may be produced so slowly as to emit no light whatever.

The specimens of fluorite from Colorado, like those from the localities previously mentioned, became phosphorescent by friction, best against each other, but also against other minerals and metals. The friction need not be very great to elicit light. This result is well shown by holding a piece of the mineral on a grindstone. The abraded powder remains luminous for a time, making a streak of light as the stone revolves. Other specimens of fluorite in our cabinet do not show this change of color, and do not become phosphorescent by attrition.

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### CHRISTENING AMETHYST MOUNTAIN.

BY J. SAVAGE.

Amethyst Mountain is situated upon the East fork of the Yellowstone, in the National Park, and was so named by Prof. F. V. Hayden during the summer of 1872, under the following circumstances:

The main party of Hayden's Geological Survey were camped in Cache valley, near the mouth of the East fork of the Yellowstone, while Prof. Hayden, Sir Wm. Blackmore, our English guest, and a few others, made a hurried trip to the headwaters of Clark's